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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,843	03/26/2001	John U. Knickerbocker	END000008US1	9394

7590 05/19/2006
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EXAMINER

ANDUJAR, LEONARDO

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

09/817,843

Applicant(s)

KNICKERBOCKER ET AL.

Examiner

Leonardo Andújar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02/23/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 17-21 and 35-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 17-21 and 35-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgment

1. The amendment filed on 02/23/2006 in response to the Office action mailed on 11/23/2005 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-3, 17-21 and 35-37.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Amended claims 1 and 17 appear to claim an electronic substrate having two substrates (i.e. a ball grid array & a dielectric packaging substrate; a ball grid array & a semiconductor packaging substrate). According to the specification of the instant invention the electronic package is an integral packaging substrate having a plurality of layers (see for example fig. 19). The interpretation of multiple "substrates" is not supported by the original presentation (e.g. more than one insulating substrate such as interposer, BGA, PCB, etc). In that regards, the claims was

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interpreted in light of the specification as a package/structure having a multilayer substrate.

Claim Rejections - 35 USC § 102

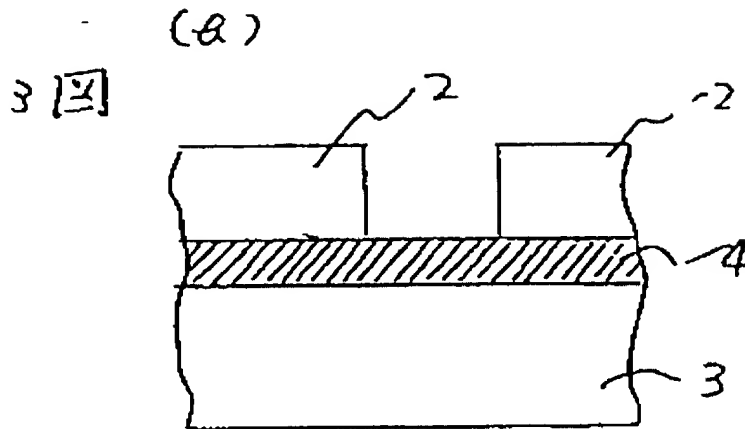
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 35 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Onda (JP-03296238 A).

6. Regarding claims 35 and 36, Onda (e.g. fig. 3b) teaches an electronic package having a selectively controlled contact pad-laminate surface adhesion comprising: a dielectric packaging substrate 3/4 having a major surface (top surface); and a copper foil 2 laminated to the major surface wherein the copper foil has one side having an smooth portion thereof (bottom surface). Also, the smooth portion contacts the major surface of the dielectric package and has a surface roughness of less than about 1 micron (see attached translation, claims 1-4 and page 2, pp. 6).



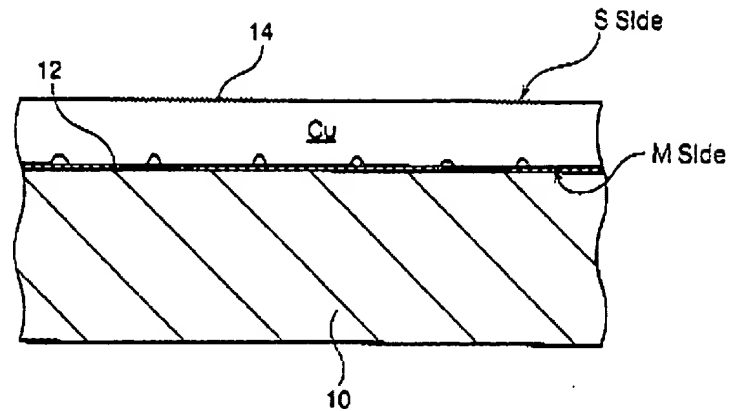
7. Regarding claim 2, Onda discloses that the conductive foil comprises copper (see claim 1).

8. Regarding claim 3, Onda discloses that the conductive foil comprises a high electrical conductivity material such as copper (see claim 1).

9. Claims 1-3 and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Kurabe et al. (US 6,291,081).

10. Regarding claims 1 and 35, Kurabe (e.g. fig. 6) teaches an electronic package having a selectively controlled contact pad-laminate surface adhesion comprising: a ball grid array package (col. 1/lls. 7-15; col. 14/lls. 28-27) including a dielectric packaging substrate 10 having a major surface (top surface); and a copper foil laminated to the major surface wherein the copper foil has one side having an smooth portion (M side) thereof. The smooth portion contacts the major surface of the dielectric package and has a surface roughness of less than about 2 micron (see abstract & col. 12/lls. 55-67).

Fig.6



11. Regarding claim 2, Kurabe discloses that the conductive foil comprises copper (see abstract).

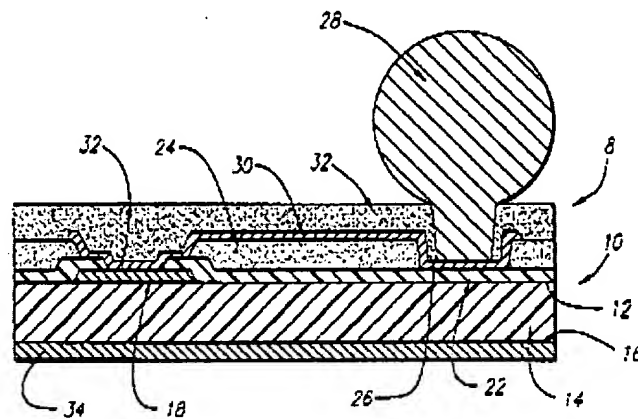
12. Regarding claim 3, Kurabe discloses that the conductive foil comprises a high electrical conductivity material such as copper (see abstract).

Claims 17-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Elenius et al. (US 6,441,487).

13. Regarding claim 17, Elenius (e.g. figs. 1 and 2) shows an electronic package comprising a ball grid array package (see the array formed by solder balls 26; see top view) having a semiconductor packaging substrate 12 having a major surface; a first mechanically compliant dielectric layer 22 formed over the major surface of the substrate and having at least one first opening formed therethrough; a first electrical contact pad 18 formed in the first opening and in electrical contact with the substrate; a second mechanically compliant dielectric layer 24 formed over the first compliant layer and having at least one second opening formed therethrough wherein the second opening is substantially offset from the first opening; a second electrical conductive pad

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30 formed in the second opening and extending over a portion of the first electrical contact pad and contacting the first electrical contact pad; a mask layer 32 formed over the second compliant layer and having a third opening therethrough in communication with the second electrical contact pad; and a solder ball 28 solderably connected to the second electrical contact pad and extending through the third opening.



14. Regarding claim 18, Elenius shows that the mask is a solder mask.

15. Regarding claim 19, Elenius shows that the compliant layers can be made of benzocyclobutene. Benzocyclobutene is a photoresist material (e.g. US 6,361,926, col.1/lls. 56-59).

16. Regarding claim 20 and 21, Elenius discloses that the contact pads may comprise aluminum, nickel or copper (col. 7/lls. 1-28).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claims 37 is rejected under 35 U.S.C. 103(a) as being obvious over Onda (JP-03296238 A).

20. Regarding claim 37, Onda shows conductive foil having a surface roughness of 0.01-1.0 microns (see claim 4). However, the specific roughness claimed by applicant, i.e., less than 0.01 microns, absent any criticality, is only considered to be the "optimum" roughness value of the conductive surface disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as an opening in the housing is used as already suggested by the Prior Art. Note that Onda suggests that the surface roughness is a variable that can be subjected to optimization (see page 2/lls. 26-32).

21. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being obvious over Kurabe et al. (US 6,291,081).

22. Regarding claims 36 and 37, Kurabe shows conductive foil having a surface roughness of 1 micron (see abstract). However, the specific roughness claimed by applicant, i.e., less than 1.0 or 0.01 microns, absent any criticality, is only considered to be the "optimum" roughness value of the conductive surface disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as an opening in the housing is used as already suggested by the Prior Art. Note that Kurabe suggests that the surface roughness is a variable that can be subjected to optimization (col. 3/lls. 18-40 & col. 4/lls. 32-51).

Response to Arguments

23. Applicant's arguments filed 02/23/2006 have been fully considered but they are not persuasive.

24. Applicant argues that Kurabe is silent with regards that the matte side of the foil disclosed by Kurabe is in contact with substrate and not the smooth side. Although the applicant uses terms different to those of Kurabe to label the claimed invention (smooth side instead of matte side) this does not result in any structural difference between the claimed invention and the prior art. The use different terminology to describe the

plurality of elements that constitute an integrated circuit as this is just a writing style and the way in which a structural limitation is expressed does not affect the configuration of the described elements. Furthermore, the "matte side" of Kurabe can be labeled as "smooth" for examination purpose because a surface having a roughness of less than about 2 micron can be considered smooth accordingly to applicant's specification (see for example claim 35).

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

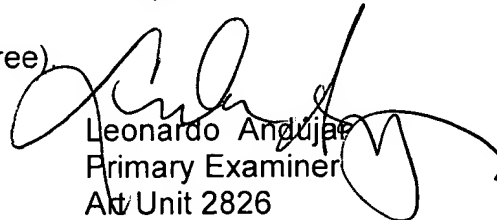
26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-

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1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Leonardo Andujar
Primary Examiner
Art Unit 2826